using sub-labels "A," "B," etc. In response to these objections, Applicant is submitting the amended specification. The Examiner requested that Applicant correct any errors of which Applicant may become aware in the specification. In response, the specification have been amended in accordance with the Examiner's request. Applicant is also submitting herewith a "Request For Approval Of Drawing Changes." In particular, FIG 2A-C have been replaced by FIG. 4A-C and conversely, FIG. 4A-C have been replaced by FIG. 2A-C. Accordingly, Applicant respectfully requests withdrawal of these objections.

B. Objection to Claim Informalities:

Claims 2, 3, 5, 7, 9, 11, 13, 17, and 19 were objected to because of informalities. Claims 7, 9, 11, 13, 17, and 19 were objected to because the word "winded" was used instead of "wound." Claim 11 was objected to because the phrase "coiled electrode" was omitted form the end of the claim. Claims 2 and 3 were objected to because the word "value" was used instead of "valve." Finally, in claim 5, "welded" should be "is welded." In response to these objections, the claims have been amended in accordance to the Examiner's objections. Accordingly, Applicant respectfully requests withdrawal of these objections.

C. § 112 Rejections:

Claims 3 and 10 were rejected under 35 U.S.C. § 112, first paragraph, because the specification did not enable a person skilled in the art to which it pertains to make and use the invention commensurate in scope with the claims. Applicant disagrees that the specification does not enable the invention. In response to this objection, the specification has been amended to clarify claims 3 and 10.(Page 20-22, lines 25-5.) Applicant respectfully requests withdrawal of this objection.

Claims 15 and 17-19 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for not pointing out and distinctly claim the subject matter which Applicant regards as

invention. In response to this rejection, Applicant has amended claims 15 and 17-18 for clarification. In particular, claim 15 and 18 recite "a [the] safety valve according to claim 14," which claim 14 recites a safety valve. Also, claim 17 recites "a [the] nonaqueous electrolyte secondary battery according to claim 16," which claim 16 recites a nonaqueous electrolyte secondary battery. Accordingly, Applicant respectfully requests withdrawal of this objection.

D. § 102(e) Rejection:

Claims 1, 2, and 5 were rejected under 35 U.S.C. § 102(e) as being anticipated by JP 2000-021380. Applicant respectfully traverses this rejection. § 102(e) does not apply to an international application such as JP 2000-021380. Thus, Applicant respectfully requests withdrawal of this objection.

E. § 103(a) Rejections:

Claims 6-9, 11, and 13 were rejected under 35 U.S.C. § 103(a) as being unpatentable over JP 2000-021380. Applicant respectfully traverses this rejection. The present application claims priority to JP 2000-021380, published on January 21, 2000. Applicant's English translated priority documents and declaration are enclosed with this Amendment. Applicant's invention report claims a nonaqueous electrolyte secondary battery in which at least a disk and a safety valve are arranged on one end side of a cylindrical outer packaging can holding an electrode element wherein the disk has a central hole, the safety valve has a projecting portion projecting toward the electrode element at the central portion of the safety valve, and the projecting portion is connected to a lead of the electrode through the central hole of the disk which is characterized as having a linear thin portion. (Page 1.) Accordingly, Applicant respectfully submits that JP 2000-021380 dose not qualify as a prior art reference, and respectfully withdrawal this rejection.

In the alternative, Applicant has amended claim 1 to include the limitation of having a plurality of thin portion along a large and a small-diameter circle. JP 2000-021380 neither

discloses or suggests a safety valve having two different dimension circles which a plurality of linear thin portions are formed to allow a current cut-off operation to be performed reliably in a current cut-off state, and a gas can be discharged within a short period of time in a cleavage state. Claims 6-9, 11, and 13 are depend directly or indirectly from claim 1 and are therefore allowable for at least the same reasons that claim 1 is allowable.

Claims 3, 4, 10 and 12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over JP 2000-021380 as applied to claims 1, 2, 5-9, 11, and 13 above, and further in view of JP 10-284035. Applicant respectfully traverses this rejection. As discussed above, Applicant respectfully submits that JP 2000-021380 does not quality as prior art reference, and respectfully requests withdrawal of this rejection.

In the alternative, Applicant has amended claim 1 to include the limitation of having a plurality of thin portion along a large and a small-diameter circle. Neither JP 2000-021380 nor JP 10-284035 discloses or suggests a safety valve having two different dimension circles which a plurality of linear thin portions are formed to allow a current cut-off operation to be performed reliably in a current cut-off state, and a gas can be discharged within a short period of time in a cleavage state. Claims 3, 4, 10, and 12 are depend directly or indirectly from claim 1 and are therefore allowable for at least the same reasons that claim 1 is allowable. Thus, Applicant respectfully requests withdrawal of these objections.

Claims 14-19 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Taki et al (U.S. Patent NO. 5,418,082) in view of JP 10-284035. Applicant respectfully traverses this rejection. In response to this rejection, claims 14, 15, 17, and 18 have been amended. The newly amended claim 14 describes a disk having a central hole and a plurality of peripheral holes forming the outer periphery of the disk. Further, the newly amended claim 14 also has a disk where the linear thin portion of the disk is formed along a circle centering on the central hole.

Forming along the outer periphery of the disk and centering along the circle allows a current cut-off operation be reliably performed in a current cut-off state, and a gas can be discharged within a short period of time in a cleavage state. Taki et al fails to disclose or suggest that a disk has a linear portion formed in a circular shape surrounding the hole. Instead Taki et al merely discloses a disk having a central hole. Similarly, JP 10-284035 only discloses a safety valve welded to a lower disk having a circular thin portion. Therefore, Taki et al in view of JP 10-284035 still fails to disclose or suggest Applicant's claims 14. Claims 15-19 are depend directly or indirectly from claim 14 and are therefore allowable for at least the same reasons that claim 14 is allowable. Applicant respectfully submits the rejection has been overcome and requests that it be withdrawn.

In view of the foregoing, it is submitted that pending claims are patentable over the reference cited by the Examiner. Further, all of the Examiner's objections and rejections have been addressed herein. It is, therefore, submitted that the application is in condition for allowance. Notice to that effect is respectfully requested.

Respectfully submitted,

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I hereby certify that this document and any being referred to as attached or enclosed is being deposited with the United States Postal Service as First Class Mail in an envelope addressed to Assistant Commissioner for Patents, Washington, D.C. 20231, on

Jan 7, 2003 David R. Metzger

Signature Date

11498932v1

VERSION WITH MARKINGS TO SHOW CHANGES MADE IN THE SPECIFICATION

IN THE SPECIFICATION

Please replace the paragraph beginning on page 1, line 21 with the following paragraph:

A conventional nonaqueous electrolyte secondary battery will be described below with reference to FIGS. 4A-C to 6.

Please replace the paragraph beginning on page 1, line 23 with the following paragraph:

FIG. 4A is a sectional view showing a conventional nonaqueous electrolyte secondary battery (e.g., disclosed in Japanese laid-open patent publication No. 8-315798).

Please replace the paragraph beginning on page 3, line 15 with the following paragraph:

FIG. 7[6]A is a plan view and a sectional view which show the configuration of the safety valve used in the conventional nonaqueous electrolyte secondary battery in a normal state. As shown in FIG. 7[6]A , a linear thin portion 6d[e] is formed almost along a circle centering on the projecting portion 6e[a]. In addition, four thin portions 6d[e] extending in the radial direction are formed outside the linear thin portion 6c.

Please replace the paragraph beginning on page 3, line 25 with the following paragraph:

In FIG. 8[4]B, an edge portion 11a is a belt-like plate which partially constitutes the disk 11 and has a circular shape at the outside of the plate. The outer edge portion 11a itself is fixed to the gasket 8 to support the disk 11 as a whole.

Please replace the paragraph beginning on page 5, line 24 with the following paragraph:

Here, the transformation of the safety valve 6 will be further described. As shown in FIG. 2[5]B, when the safety valve 6 is transformed, the safety valve 6 is largely transformed at positions 6k and 6l. More specifically, the position 6k indicates the outer periphery of a flat region inside the safety valve 6, and the position 6l indicates a position which is very close to the projecting portion 6a. The position 6l which is the bending point of these portions corresponds to the portion of the thin position 6c in FIG. 7[6]A. Since the portion of the thin portion 6c is mechanically weakest, the thin portion 6c is maximally transformed by pressure.

Please replace the paragraph beginning on page 6, line 17 with the following paragraph:

As is apparent from FIG. 2[5]B, the distance between the bending points 6k and 6l is large. For this reason, due to the transformation of the safety valve 6, the projecting portion 6a is largely separated from the sub-disk 4. In this manner, since the projecting portion 6a and the sub-disk 4 are largely separated from each other, a current cut-off operation can be reliably performed.

Please replace the paragraph beginning on page 7, line 6 with the following paragraph:

A cleaving operation of the safety valve 6 will be described below with reference to FIG. 7B. FIG. 7B includes a plan view and a sectional view showing a cleaving manner of a safety valve used in a conventional nonaqueous electrolyte secondary battery in a cleavage state.

Please replace the paragraph beginning on page 10, line 12 with the following paragraph:

FIG. 2 is a fragmentary cross-sectional view [showing an action of a safety valve in a normal state, a current cut-off state, and a cleavage state in the nonaqueous electrolyte secondary battery according to the present invention] illustrating an enclosed-type nonaqueous electrolyte

secondary cell placed in the normal state and current interrupted state and rupture state; which current is interrupted by the raised internal pressure, vent is ruptured by the raised internal pressure;

FIG. 2A is a fragmentary cross-sectional view of the enclosed-type secondary cell in normal state;

FIG. 2B is a fragmentary cross-sectional view of the enclosed-type secondary cell in which a current is interrupted by the raised internal pressure;

FIG. 2A-C is a fragmentary cross-sectional view illustrating the enclosed-type secondary cell in which a vent is ruptured by the raised internal pressure;

Please cancel the paragraph beginning on page 10, line 16;

Please add the following paragraph beginning on page 10, line 16:

FIG. 3 is a fragmentary plan view and cross-sectional view, of a present invention enclosed-type nonaqueous electrolyte secondary cell;

FIG. 3A is a plan view and cross-sectional view, of a safety vent in normal state;

FIG. 3A-A,B is a plainly view and cross-sectional view, respectively, of a safety vent in rupture state by the raised internal pressure;

Please cancel the paragraph beginning on page 10, line 21;

Please add the following paragraph beginning on page 10, line 21:

FIG. 4 is a fragmentary end cross-sectional view and plan view, of an enclosed-type nonaqueous electrolyte secondary cell according to an embodiment of the present invention, in normal state, and current interrupted state, and vent rupture state;

FIG. 4A-C is a fragmentary end cross-sectional view, the enclosed-type secondary cell in which a safety vent is ruptured by the race internal pressure;

Please cancel the paragraph beginning on page 10, line 25;

Please add the following paragraph beginning on page 10, line 25:

FIG. 5A-D is a fragmentary plan view of second invention, the enclosed-type secondary cell in which a safety vent is ruptured by the race internal pressure;

Please cancel the paragraph beginning on page 11, line 2;

Please add the following paragraph beginning on page 11, line 2:

FIG. 7 is a fragmentary cross-sectional view and plan view of a conventional enclosed nonaqueous electrolyte secondary battery;

FIG. 7a-b is a fragmentary plan view of a conventional safety vent construction;

Please cancel the paragraph beginning on page 11, line 6;

Please add the following paragraph beginning on page 11, line 6:

FIG. 8A-B is a fragmentary cross-sectional view of a conventional enclosed-type secondary cell in which a current is interrupted by the raised internal pressure.

Please replace the paragraph beginning on page 20, line 25 with the following paragraph:

Here, the transformation of the safety valve 6 will be further described in detail. As is apparent from FIG. 2B, when the safety valve 6 is transformed, and the safety valve 6 is largely transformed at the bending points [positions] 6k and 6l. More specifically, the portions are the position 6k which indicates the outer peripheral of the inner flat region of the safety valve 6 and

the bending point [position] 6l which is very close to the projecting portion 6a. The bending point [position] 6l which is the bending point corresponds to a portion along the small-diameter circle in FIG. 3A, i.e., the positions of the thin portions 6g. Since the positions of the thin portions 6g are mechanically weakest, the thin portions 6g are maximally transformed by pressure. Other portions except for these portions, i.e., the projecting portion 6a is rarely transformed, and the flat portion outside a projecting portion 6s is slightly transformed.

Please replace the paragraph beginning on page 21, line 21 with the following paragraph:

In the conventional safety valve 6 described in FIG. 6A, the advantage described above cannot be achieved by simply increasing the diameter of the circle of the thin portion 6c. More specifically, in this case, since the thin portion is bent at the position of the thin portion 6c, the distance corresponding to the distance between the bending points [positions] 6k and 6l in FIG. 2B decreases. As a result, the projecting portion 6a and the sub-disk 4 cannot be sufficiently separated from each other. As a result, the reliability of the current cut-off operation is degraded.

Please replace the paragraph beginning on page 25, line 6 with the following paragraph:

From the observation results, when the cleavage states of the safety valve used in this embodiment and the conventional safety valve are compared with each other, the passage area for generated gas is only an area corresponding to the projecting portion 6e of the central circle and the small gaps of the thin portions 6d formed in the circumference in the prior art. In this embodiment, since the separate portion 6f is almost separated, the passage area is large. Therefore, when gas is generated in the outer packaging can 1, the generated gas can be released outside within a short period of time by the safety valve used in this embodiment rather than the conventional safety valve.

Please replace the paragraph beginning on page 27, line 14 with the following paragraph:

More specifically, the positive electrode lead 9 is electrically connected to the safety valve 6 through the sub-disk 4, the projecting portion 6a, the PTC element 3, and the lid 7. However, when the sub-disk 4 and the projecting portion 6a are separated from each other as described above, the electric connection between the positive electrode [anode] lead 9 and the lid 7 is also cut.

Please replace the paragraph beginning on page 27, line 21 with the following paragraph:

The transformation will be described in detail here. As is apparent from FIG. 5B, when the safety valve 6 is transformed, the safety valve 6 is largely transformed at the bending points [positions] 6k and 6l.

Please replace the paragraph beginning on page 28, line 21 with the following paragraph:

In this manner, when the safety valve 6 is cleaved, but when the disk 11 is cleaved, a gas generated in the battery passes through the peripheral holes 11d of the disk 11, passes through the safety valve main body [cleaved portion] 6b of the safety valve 6, and passes through a ventilation hole 7a of the lid 7 to be released outside.

Please replace the paragraph beginning on page 29, line 2 with the following paragraph:

When the pressure is further higher than the pressure at which the cleavage mechanism of the safety valve operates, the cleavage mechanism of the disk 11 operates. More specifically, a separate portion 11g of the disk 11 is separated from the disk 11. In this manner, the separate portion 11g is floated, and a cleaved portion 11h is formed around the separate portion 11g. As a

result, a gas generated in the battery can pass through not only the peripheral holes 11d of the disk, but also the cleaved portion 11h of the disk 11 at the same time. In addition, the generated gas passes through the safety valve main body [cleaved portion] 6b of the safety valve 6 and passes through the ventilation hole 7a of the lid 7 to be discharged outside.

Please replace the paragraph beginning on page 29, line 15 with the following paragraph:

A cleavage manner of the disk 11 will be described here with reference to FIG. 5A. FIG. 5A is a plan view showing a manner of a disk used in the nonaqueous electrolyte secondary battery according to this embodiment in a cleavage state.

IN THE CLAIMS

Claims 1-3, 7, 9, 11, 13-15, 17 and 18 are amended as follows:

1. A nonaqueous electrolyte secondary battery in which a safety valve is arranged on one end side of a cylindrical outer packaging can holding an electrode element therein, and the safety valve comprising a projecting portion projecting toward the electrode element and connected to a lead of the electrode element at the center of the safety valve, wherein

a plurality of linear thin portions are formed almost along at least two circumferences centering on the projecting portion;

a small circle having a small diameter and a circle having a large diameter circle exist;

a plurality of linear thin portions along the large diameter circle and a plurality of linear thin portions along the small diameter circle are formed almost equal portion to each other centering on the projection portion; and

a thin portion extending in a radial direction is formed across end portions of the linear thin portions adjacent to each other.

2. A nonaqueous electrolyte secondary battery according to claim 1, wherein said safety valve [value] comprises the lengths of the plurality of linear thin portions along the same circumference being almost equal to each other.

3. A nonaqueous electrolyte secondary battery according to claim 1, wherein said safety valve [value] comprises at least a disk and a safety valve arranged on one end side of the cylindrical outer packaging can holding an electrode element therein, said disk has a portion having a thickness smaller than that of a peripheral portion, and the projecting portion is connected to the lead of the electrode element through the small-thickness portion of the disk.

7. A nonaqueous electrolyte secondary battery according to claim 5, characterized by comprising an electrode member constituted by laminating the positive electrode and the negative electrode across a separator and wound [winded] in the shape of a spirally coiled electrode.

9. A nonaqueous electrolyte secondary battery according to claim 8 [7], characterized by comprising an electrode member constituted by laminating the positive electrode and the negative electrode through a separator and wound [winded] in the shape of a spirally coiled electrode.

11. A nonaqueous electrolyte secondary battery according to claim 10 [9], wherein said battery comprises an electrode member constituted by laminating the positive electrode and the negative electrode across a separator and wound [winded] in the shape of a spirally coiled electrode.

13. A nonaqueous electrolyte secondary battery according to claim 12 [11], characterized by comprising an electrode member constituted by laminating the positive electrode and the negative electrode across a separator and wound [winded] in the shape of a spirally coiled electrode.

14. A safety valve for battery wherein at least a disk and a safety valve are arranged on one end side of a cylindrical outer packaging can holding an electrode element therein, the disk has a central hole, and

a plurality of a peripheral hole formed on the outer periphery of the disk, and

the safety valve has a projecting portion projecting toward the electrode element at the central portion of the safety valve, and

the projecting portion is connected to a lead of the electrode element through the central hole of the disk, characterized in that the disk has a linear thin portion[.] , and

the linear thin portion is formed almost along a circle centering on the central hole.

15. A safety valve according to claim 14 [13], wherein said thin portion is almost along a circle centering on a symmetrical point of the central hole.

17. A nonaqueous electrolyte secondary battery according to claim 16 [15], wherein said battery comprising an electrode member constituted by laminating the positive electrode and the negative electrode across a separator and wound [winded] in the shape of a spirally coiled electrode.

18. A nonaqueous electrolyte secondary battery characterized by comprising the safety valve according to claim 14 [13], wherein said battery comprises a material which can dope and undope lithium as the positive electrode and negative electrode active materials, and a nonaqueous electrolyte.